

CLAIMS

We claim:

- 1 1. A mechanical draft system comprising:
 - 2 an intake fan for drawing air from outside a mechanical room into the
 - 3 mechanical room;
 - 4 a plurality of appliances, each appliance having an air intake for drawing
 - 5 air from the mechanical room into the appliance and having an air exhaust for
 - 6 exhausting air out of the appliance;
 - 7 ducts, connected to the air exhausts of the appliances, for transporting air
 - 8 outside the mechanical room;
 - 9 an exhaust fan, connected to the ducts, for drawing air from the ducts to
 - 10 the atmosphere;
 - 11 a differential transducer for receiving a first pressure reading from inside
 - 12 the mechanical room and a second pressure reading from the atmosphere, the
 - 13 differential transducer outputting a differential pressure signal indicative of the
 - 14 difference between the first and second pressure readings; and
 - 15 a pressure controller for controlling the speed of the intake fan, the speed
 - 16 of the exhaust fan, and the operation of the plurality of appliances in response to
 - 17 the differential pressure signal.

1 2. The mechanical draft system of claim 1, further comprising:
2 an intake fan interface connected between the pressure controller and the
3 intake fan;
4 an exhaust fan interface connected between the pressure controller and the
5 exhaust fan; and
6 a plurality of appliance interfaces, each appliance interface connected
7 between the pressure controller and the respective appliance.

1 3. The mechanical draft system of claim 2, wherein the intake fan
2 interface and exhaust fan interface are configured to indicate to the pressure
3 controller the presence of the respective fan, to indicate to the pressure controller
4 whether the respective fan is operating properly, and to indicate to the pressure
5 controller the speed of the respective fan.

1 4. The mechanical draft system of claim 2, wherein the appliance
2 interfaces are configured to indicate to the pressure controller the presence of the
3 respective appliance and to indicated to the pressure controller whether the
4 respective appliance is running.

1 5. The mechanical draft system of claim 1, further comprising:
2 a first pressure sensor, located within the mechanical room, for supplying
3 said first pressure reading; and
4 a second pressure sensor, located within the atmosphere, for supplying said
5 second pressure reading.

1 6. The mechanical draft system of claim 1, further comprising:
2 a plurality of adjustable baffles, each adjustable baffle corresponding to a
3 respective appliance and connected in the air exhaust of the respective appliances;
4 and
5 a modulating damper connected in the ducts;
6 wherein the pressure controller controls the position of the adjustable
7 baffles and modulating damper.

1 7. A pressure controller for controlling the flow of air through a
2 mechanical draft system, the pressure controller comprising:
3 an appliance controller configured to control the operation of a plurality of
4 appliances;
5 an intake fan controller configured to control the speed of an intake fan;
6 an exhaust fan controller configured to control the speed of an exhaust fan;
7 and
8 a processor configured to receive a differential pressure signal and to
9 control the operation of the plurality of appliances, the speed of the intake fan,
10 and the speed of the exhaust fan in response to the differential pressure signal.

1 8. The pressure controller of claim 7, further comprising:
2 at least one input device configured to receive inputs for establishing
3 operation parameters of the mechanical draft system; and
4 at least one display device configured to display operation conditions of
5 the mechanical draft system.

1 9. The pressure controller of claim 7, wherein the appliance controller
2 controls up to six appliances.

1 10. The pressure controller of claim 9, further comprising a relay board,
2 wherein the appliance controller and relay board control up to ten appliances.

1 11. The pressure controller of claim 9, further comprising an external
2 communication link for connection with one or more relay boxes, wherein the
3 appliance controller and relay boxes control more than ten appliances.

1 12. The pressure controller of claim 7, wherein the plurality of
2 appliances comprises boilers, furnaces, water heaters, or laundry dryers.

1 13. The pressure controller of claim 7, further comprising an RS-232
2 port for connecting the processor to an external processor.

1 14. The pressure controller of claim 7, wherein the processor comprises
2 an input for receiving the differential pressure signal from a differential
3 transducer.

1 15. The pressure controller of claim 14, wherein the differential
2 pressure signal is the difference in pressure between the atmosphere and a
3 mechanical room in which the plurality of appliances are located.

1 16. A control system for controlling air pressure in a mechanical draft
2 system, the control system comprising:

3 means for determining a difference in pressure between the atmosphere
4 and the interior of a mechanical room;

5 means for controller the speed of an intake fan and exhaust fan in response
6 to the difference in pressure; and

7 means for shutting down a plurality of appliances in the mechanical room
8 when the difference in pressure exceeds a predetermined threshold.

1 17. The control system of claim 16, further comprising means for
2 resetting appliances that have been shut down when the difference in pressure no
3 longer exceeds the predetermined threshold.

1 18. A program, stored on a computer-readable medium, for performing
2 a fan-rotation-check routine, the program comprising:

3 logic configured to receive a fan-rotation-check request; and

4 logic, in response to the fan-rotation-check request, configured to supply a
5 low power signal to a fan installed in a mechanical draft system, the low power
6 signal causing the fan to rotate at a slow speed, thereby allowing the direction of
7 rotation to be visually inspected.

1 19. The program of claim 18, further comprising logic configured to
2 instruct an installer to change power source connections to terminals of the fan
3 when the direction of rotation is incorrect.

1 20. A method for controlling pressure in a mechanical draft system, the
2 method comprising:
3 checking a differential pressure between the interior of a mechanical room
4 and the atmosphere;
5 shutting down a plurality of appliances in the mechanical room when the
6 differential pressure exceeds a predetermined threshold; and
7 adjusting the speed of an intake fan and exhaust fan in the mechanical draft
8 system when the differential pressure is not equalized.

1 21. The method of claim 20, further comprising:
2 maintaining the speed of the intake fan and exhaust fan when the
3 differential pressure is equalized.

1 22. The method of claim 20, wherein, when the pressure inside the
2 mechanical room is greater than the pressure in the atmosphere, said adjusting
3 comprises at least one of:
4 decreasing the speed of the intake fan; and
5 increasing the speed of the exhaust fan.

1 23. The method of claim 20, wherein, when the pressure in the
2 atmosphere is greater than the pressure inside the mechanical room, said adjusting
3 comprises at least one of:
4 increasing the speed of the intake fan; and
5 decreasing the speed of the exhaust fan.

1 24. The method of claim 23, further comprising:
2 adjusting the position of adjustable baffles in exhaust ducts from each
3 appliance.

1 25. The method of claim 20, further comprising:
2 adjusting the position of a modulating damper when the differential
3 pressure is not equalized.26. A processor for controlling a mechanical draft
4 system, the processor comprising:
5 means for shutting down a plurality of appliances when a differential
6 pressure exceeds a predetermined threshold;
7 means for restarting the appliances in succession in an order based on a
8 priority list; and
9 means for monitoring the differential pressure to ensure that the means for
10 restarting does not cause the differential pressure to exceed the predetermined
11 threshold.

1 27. The processor of claim 26, further comprising means for
2 determining if an exhaust fan is operating properly.

1 28. The processor of claim 27, wherein the means for restarting restarts
2 the plurality of appliances when the means for determining determines that the
3 exhaust fan is operating properly.

1 29. The processor of claim 26, wherein the priority list is based on the
2 proximity of the appliances to a vertical stack.

1 30. A system for exercising the bearings of a fan in a mechanical draft
2 apparatus, the system comprising:
3 a timing device operative to time the period of inactivity of appliances in
4 the mechanical draft apparatus;
5 means for determining when the timing device reaches a first
6 predetermined time period; and
7 a fan controller operative to run a fan for a second predetermined time
8 period when the determining means determines that the first predetermined time
9 period has elapsed.